

Claims

1. A radiation detector for detecting radiation according to a defined spectral sensitivity distribution (14) having a sensitivity maximum at a defined wavelength  $\lambda_0$ , said radiation detector comprising at least one semiconductor chip (1) and at least one optical filter disposed after said semiconductor chip (1),

characterized in that

- said semiconductor chip contains at least one III-V semiconductor material;
- said optical filter absorbs radiation of a wavelength that is greater than the wavelength  $\lambda_0$  of the sensitivity maximum.

2. The radiation detector as in claim 1,

characterized in that

said defined spectral sensitivity distribution (14) is that of the human eye.

3. A radiation detector comprising at least one semiconductor chip (1) and operative to detect radiation according to the spectral sensitivity distribution (14) of the human eye,

characterized in that

said semiconductor chip (1) contains at least one III-V semiconductor material.

4. The radiation detector as in claim 3,

characterized in that

said radiation detector comprises at least one optical filter disposed after said semiconductor chip (1), and said optical filter absorbs radiation of a wavelength that is greater than the wavelength  $\lambda_0'$  of the sensitivity maximum of the human eye.

5. The radiation detector as in one of the preceding claims,

characterized in that

said semiconductor chip is an LED chip.

6. The radiation detector as in one of the preceding claims,  
characterized in that

the sensitivity of said semiconductor chip (1) exhibits at least one maximum (13) at a wavelength  $\lambda_1$ , said wavelength differing by no more than 50 nm, preferably no more than 15 nm, from the wavelength  $\lambda_0$  or the wavelength  $\lambda_0'$ .

7. The radiation detector as in one of the preceding claims,  
characterized in that

said detector comprises an encapsulation (4) that at least partially surrounds said semiconductor chip (1).

8. The radiation detector as in claim 7,  
characterized in that

said encapsulation (4) contains a resin, preferably a reaction resin.

9. The radiation detector as in claim 7 or 8,  
characterized in that

said optical filter is disposed at least partially inside, outside and/or on said encapsulation (4)  
and/or the encapsulant itself constitutes the filter.

10. The radiation detector as in one of the preceding claims,  
characterized in that

said optical filter contains a plurality of filter particles (5).

11. The radiation detector as in one of the preceding claims,  
characterized in that

said semiconductor chip (1) comprises a filter layer (3).

12. The radiation detector as in claim 11,  
characterized in that

said filter layer (3) absorbs wavelengths that are smaller than  $\lambda_0$  or  $\lambda_0'$ .

13. The radiation detector as in one of the preceding claims,  
characterized in that

said radiation detector has a detector sensitivity (12) such that at an arbitrary wavelength, the difference between the corresponding values of said detector sensitivity (12) and said defined sensitivity (14) is less than 40%, preferably less than 25%.

14. The radiation detector as in one of the preceding claims,  
characterized in that

said III-V semiconductor material is  $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{P}$ ,  $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{N}$  or  $\text{In}_x\text{Ga}_y\text{Al}_{1-x-y}\text{As}$ , with in each case  $0 \leq x \leq 1$ ,  $0 \leq y \leq 1$  and  $x + y \leq 1$ .

15. The radiation detector as in one of claims 5 to 14,  
characterized in that

the emission wavelength of said LED chip (1) is in the red region of the spectrum.

16. The use of a radiation detector as in one of the preceding claims  
as  
an environmental light sensor.

17. The use of a radiation detector as in one of the preceding claims  
for  
controlling the exertion of an influence on devices whose manner of operation, period of operation, perception and/or use is related to the defined spectral sensitivity distribution.

18. The use of a radiation detector as in one of the preceding claims  
for  
controlling the brightness of lighting devices.

19. The use of a radiation detector as in one of the preceding claims  
for  
controlling the brightness of the backlighting of LCD screens.

20. The use of a radiation detector as in one of the preceding claims  
for  
controlling the brightness of indicators.

21. The use of a radiation detector as in one of the preceding claims  
for  
controlling the turn-on or turn-off instants of lighting devices.